**Laura Rizzo**

**Midterm Lesson: Water Cycle fraction activity**

**Grade 3**

**Duration: 1 hour**

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| **Learning Objective** | Students will be able to explain how Earth’s water is used and reused through the water cycle.  Students will be able to tally the number of visits to each station, and create a fraction to represent the data. |
| **Overview** | Students will extend their understanding of the water cycle to show that it doesn’t just follow one predictable path. They will do this by playing a game to create a water cycle bead bracelet. Students move through the water cycle, collecting colored beads representing each part of the water cycle. They will then create a mathematical representation of their data which we will discuss and analyze as a class. |
| **Teacher**  **Standards** | Domain 3 Instruction  Component 3C Engaging Students in Learning |
| **Student**  **Standards** | 4.2. Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.   * 4.2.1c. Water is recycled by natural processes on Earth  1.1. Mathematical Analysis: Abstraction and symbolic representation are used to communicate mathematically.M1.1c Apply mathematical skills to describe the natural world3.NF Develop understanding of fractions as numbers1. Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a*  parts of size 1/*b.* |
| **Materials and Resources** | * Pipe cleaners (1 per student) * Beads (8 colors): black – ground water, orange – human/animal, white – cloud, brown – mountain, green – plant, grey – city, blue – ocean, turquoise – river/stream * 8 containers (one for each color bead) * 3-4 dice per station * Water cycle activity cards * Photos of water cycle parts for each station * Water destination sheet * Fraction tally/data sheet |
| **Prior Knowledge** | Students will already have some basic understanding of the water cycle. Their understanding includes: precipitation flowing from a stream to an ocean, evaporating to the clouds, raining down on a mountaintop, and flowing back into a stream |
| **Set Up:** | 8 stations will be set up around the classroom to represent different parts of the water cycle. Each station will include: a container of one color bead, an activity card (which tells them their next destination and how they got there) and a photograph for that part of the water cycle, dice |
| **Procedure:** | * Students will be evenly spread out among the stations and each given a pipe cleaner (bracelet) * Students will first take a bead from that station and put it on their pipe cleaner. They will record their starting station on their Water Destination Sheet. * Students will then roll the dice. They will look at the Water Cycle Activity Card and read the destination sentences that go along with the number rolled * They will write down their next destination, and how they will get there, on their Destination Sheet * Students will move to the next destination * When they get to their next destination, they will take a bead from that destination and add it to their bracelet * Students will repeat this process ten times * Next, students will use their fraction tally sheet to tally up how many times they visited each station and create fractions * As class, we will discuss and analyze bracelet results |
| **Assessment** | * Students will write a story as if they were a water molecule. They must include different parts of the water cycle and explain how they got there. * Fraction tally/data sheet |

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**Water Cycle Activity Rubric**

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|  | **4** | **3** | **2** | **1** |
| **Water cycle process** | **Your water molecule travels to 5 or more parts of the water cycle.** | **Your molecule travels to 4 parts of the water cycle.** | **Your molecule travels to 3 parts of the water cycle.** | **Your molecule travels to less than 3 parts of the water cycle.** |
| **Transitions** | **Explanation of how the water molecule traveled from one destination to another is clearly explained and accurate.** | **Explanation of how the water molecule traveled from one destination to another is explained and mostly accurate.** | **Explanation of how the water molecule traveled from one destination to another is partially explained.** | **Explanation of how the water molecule traveled from one destination to another not explained or is unclear.** |
| **Fraction sheet** | **Fractions are all accurately calculated.** | **Fractions calculations are mostly accurate (1 or 2 errors)** | **Fraction calculations are somewhat accurate (3 or 4 errors)** | **Fraction calculations are inaccurate (more than 4 errors)** |

**The Water Cycle Game Activity Cards**

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| **Station** | **Die roll** | **Destination** |
| **Mountain** | **1** | **You roll downhill and become part of a stream. Go to River/Stream.** |
| **2** | **You roll downhill and become part of a river.**  **Go to River/Stream** |
| **3** | **You soak into the ground and become part of the groundwater.**  **Go to Groundwater.** |
| **4** | **You soak into the ground and get sucked up by a plant’s roots.**  **Go to Plant.** |
| **5** | **You get frozen and turn to ice on the mountain. Stay at Mountain.** |
| **6** | **You roll downhill and collect in a river. Go to River/Stream.** |
|  |  |  |
| **Plant** | **1** | **The plant uses you to grow. Stay at Plant.** |
|  | **2** | **The plant stores you in its edible fruit. A human eats you. Go to Human/Animal.** |
|  | **3** | **The plant uses you to grow. Stay at Plant.** |
|  | **4** | **The plant transpires you through its leaves and you evaporate into the air. Go to Cloud.** |
|  | **5** | **The plant transpires you through its leaves and you evaporate into the air. Go to Cloud.** |
|  | **6** | **The plant stores you in its edible fruit. A human eats you. Go to Human/Animal.** |
|  |  |  |
| **City** | **1** | **A person uses you for brushing their teeth. You travel down the drain to a water treatment center and then you are sent to the ocean. Go to Ocean.** |
|  | **2** | **You are used at a car wash where you mix with soap and oil. You are washed into the gutter and flow to the river. Go to River/Stream.** |
|  | **3** | **You are pumped into a water tower to be stored and eventually distributed. Stay at City.** |
|  | **4** | **A person uses you to take a shower. You flow down the drain to a water treatment center and then you are sent to the river. Go to River/Stream.** |
|  | **5** | **You are pumped into an apartment and flow out the faucet. A human drinks you. Go to Human/Animal.** |
|  | **6** | **You are pumped into a sprinkler system to water a park. You water the grass and slowly sink into the ground. Go to Ground water.** |

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| **Station** | **Die roll** | **Destination** |
| **Ocean** | **1** | **A piece of plankton floating on the surface of the ocean takes you in and transpires you into the air. Go to Cloud.** |
| **2** | **You are one of the countless water molecules in the ocean and you stay there. Stay at Ocean.** |
| **3** | **You are swallowed by a lobster and then eaten by a human. Go to Human/Animal.** |
| **4** | **You evaporate from the surface of the Ocean into the air. Go to Cloud.** |
| **5** | **You are one of the countless water molecules in the ocean and you stay there. Stay at Ocean.** |
| **6** | **A fish uses you to breathe and exhales you through its gills back into the ocean. Stay at Ocean.** |
|  |  |  |
| **River/Stream** | **1** | **You flow into the ocean. Go to Ocean.** |
|  | **2** | **An animal comes to the stream and licks you up. Go to Human/Animal.** |
|  | **3** | **You evaporate from the surface of a river. Go to Cloud.** |
|  | **4** | **You are channeled to a city water system for city water use. Go to City.** |
|  | **5** | **You are channeled to a city water system for city water use. Go to City.** |
|  | **6** | **You flow into the ocean. Go to Ocean.** |
|  |  |  |
| **Ground water** | **1** | **A plant takes you through its roots. Go to Plant.** |
|  | **2** | **You move slowly underground between grains of sediment and eventually flow downward into a wetland and from there into a stream. Go to Stream.** |
|  | **3** | **You are pumped out of the ground from a well to irrigate a farm. Go to Plant.** |
|  | **4** | **You are pumped out of the ground for city water use. Go to City.** |
|  | **5** | **You move slowly underground and eventually flow into an ocean. Go to Ocean.** |
|  | **6** | **You are collected by a natural freshwater spring and bottled. A human drinks you. Go to Human/Animal.** |
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| **Human/Animal** | **1** | **You are perspired from the body and enter the air as vapor. Go to Cloud.** |
|  | **2** | **The body uses you for nourishment. Stay at Human/Animal.** |
|  | **3** | **You are exhaled from the lungs and enter the air as vapor. Go to Cloud.** |
|  | **4** | **You are urinated into a city water system, you are treated and sent to the ocean. Go to Ocean.** |
|  | **5** | **The body uses you for nourishment. Stay at Human/Animal.** |
|  | **6** | **You are urinated into a city water system, you are treated and sent to the ocean. Go to Ocean.** |

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| **Station** | **Die roll** | **Destination** |
| **Cloud** | **1** | **You fell as rain onto a parking lot where you mix with trash and other pollutants. You eventually evaporate. Stay at Cloud.** |
|  | **2** | **You fall as rain onto a mountain. Go to Mountain.** |
|  | **3** | **You fall as snow onto a mountain. Go to Mountain.** |
|  | **4** | **You fall as rain onto a park. A plant sucks you up through its roots. Go to Plant.** |
|  | **5** | **You are a drop of rain that falls in a heavy rainfall over the city. The city’s sewer system is quickly filled and overflows. You are mixed with raw sewage and flow into the ocean. Go to Ocean.** |
|  | **6** | **You mix with heat from the sun and pollution in the air and become acid rain. You rain into a river. Go to River/Stream.** |

**Water Destination Sheet**

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| **Station Stop** | **How will you get to your next destination?** | **Destination** |
| **Example: Cloud** | **Fell as rain** | **Plant** |
| **Plant……** |  |  |
| **1.** |  |  |
| **2.** |  |  |
| **3.** |  |  |
| **4.** |  |  |
| **5.** |  |  |
| **6.** |  |  |
| **7.** |  |  |
| **8.** |  |  |
| **9.** |  |  |
| **10.** |  |  |

**Fraction Tally/Data Sheet**

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| **Bead Color** | **Tally marks** | **Fraction** |
| **Black (ground water)** |  |  |
| **Orange (human/animal)** |  |  |
| **White (cloud)** |  |  |
| **Brown (mountain)** |  |  |
| **Green (plant)** |  |  |
| **Grey (city)** |  |  |
| **Blue (ocean)** |  |  |
| **Turquoise (river/stream)** |  |  |